In the Claims

1. (Amended) A method for transmitting data in a multi-carrier system where data from an individual user is transmitted on multiple subcarriers, the method comprising the steps of:

de-multiplexing a data stream to produce a plurality of de-multiplexed data streams;

spreading de-multiplexed data streams with a spreading code to produce a plurality of chip streams;

spreading a pilot stream to produce a spread pilot stream;

combining the spread pilot stream with a chip stream from the plurality of chip streams; and

time shifting each chip stream by a predetermined amount; and

transmitting each time-shifted chip stream on a predetermined subcarrier.

2. (Amended) The method of claim 1 [further comprising the step of code multiplexing a spread pilot with the chip stream] wherein the step of combining the spread pilot stream with the chip stream comprises the step of code multiplexing the spread pilot stream with the chip stream.

3. (Original) The method of claim 1 wherein differing spreading codes are used for at least two of the de-multiplexed data streams.

4. (Original) The method of claim 1 further comprising the steps of:

spreading a pilot stream to produce a spread pilot stream;

time shifting the pilot stream by a predetermined amount; and

transmitting the pilot stream on a predetermined subcarrier.

5. (Currently Amended). The method of claim 1 [further comprising the steps of:

spreading a pilot stream to produce a spread pilot stream;

combining the pilot stream with a chip stream from the plurality of chip streams; and]

wherein the step of time shifting each chip stream comprises the step of time shifting the combination of the pilot stream and the chip stream.

6. (Original) A method for transmitting data, the method comprising the steps of:

de-multiplexing a symbol stream to produce a plurality of de-multiplexed symbols;

spreading each symbol with a spreading code to produce a plurality spread symbols, each comprising a predetermined number of chips;

for a first transmission interval, mapping a first chip of a spread symbol to a predetermined subcarrier; and

for a second transmission interval, mapping the first chip of a spread symbol to a second subcarrier, wherein the second subcarrier differs from the first subcarrier.

7. (Original) The method of claim 6 further comprising the steps of:

spreading a pilot stream to produce a spread pilot stream comprising pilot chips; and

combining the pilot chips with chips of the spread symbols such that the chips mapped to the subcarriers comprise a combination of spread symbol chips and pilot chips.

8. (Original) The method of claim 6 wherein the de-multiplexed symbols comprises a code multiplexed pilot.

9. (Original) The method of claim 6 further comprising the step of, for the first transmission interval, mapping the spread symbol to subcarriers k to k+SF-1, and for the second transmission interval, mapping the spread symbol to m to m+SF-1, wherein SF is a spreading factor and k does not equal m.

10. (Original) A method comprising the steps of:

receiving a multicarrier signal comprising a plurality of subcarriers;

demodulating the multicarrier signal to produce a chip stream;

despreading the chip stream with a pilot code during a first symbol period to produce a first channel estimate for the first symbol period;

despreading the chip stream with the pilot code during a second symbol period to produce a second channel estimate for the second symbol period;

generating a third channel estimate only for a portion of the first symbol period based on the first and the second channel estimates; and

generating a fourth channel estimate for a second portion of the first symbol period based on the first and the second channel estimates.

11. (Original) The method of claim 10 wherein the multicarrier signal further comprises a code multiplexed pilot.

12. (Original) The method of claim 10 wherein the step of receiving the multicarrier signal comprises the step of receiving a multicarrier signal having relatively time-shifted chip streams existing on at least two subcarriers.

13. (Original) The method of claim 10 wherein the first and the second symbol period occur during a same time period and comprise chips transmitted on differing subcarriers.

14. (Original) The method of claim 10 wherein the first and the second symbol periods are non-overlapping in time.

15. (Original) The method of claim 10 wherein the first and the second symbol periods are non-overlapping in frequency.

16. (Amended) An apparatus comprising:

a de-multiplexer, de-multiplexing a data stream to produce a plurality of de-multiplexed data streams;

a spreader, spreading the de-multiplexed data streams with a spreading code to produce a plurality of chip streams;

a spreader, spreading a pilot stream to produce a spread pilot stream;

a combiner, combining the spread pilot stream with a chip stream from the plurality of chip streams;

a time shifter, time shifting each chip stream by a predetermined amount; and

a transmitter, transmitting each time-shifted chip stream on a predetermined subcarrier.

17. (Original) An apparatus comprising:

a de-multiplexer, de-multiplexing a symbol stream to produce a plurality of de-multiplexed symbols;

a spreader, spreading each symbol with a spreading code to produce a plurality spread symbols, each comprising a predetermined number of chips; and

a mapper, for a first transmission interval, mapping a first chip of a spread symbol to a predetermined subcarrier and for a second transmission interval, mapping the first chip of a spread symbol to a second subcarrier, wherein the second subcarrier differs from the first subcarrier.

18. (Original) An apparatus comprising:

a receiver, receiving a multicarrier signal comprising a plurality of subcarriers and demodulating the multicarrier signal to produce a chip stream;

a channel estimator, despreading the chip stream with a pilot code during a first symbol period to produce a first channel estimate for the first symbol period, and despreading the chip stream with the pilot code during a second symbol period to produce a second channel estimate for the second symbol period; and

an interpolator generating a third channel estimate only for a portion of the first symbol period based on the first and the second channel estimates and generating a fourth channel estimate for a second portion of the first symbol period based on the first and the second channel estimates.

19. (Newly Added) The method of claim 1 wherein differing spreading codes are used for spreading the pilot and the de-multiplexed data stream.